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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,803	02/14/2002	John Scanlan	619P	3372

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EXAMINER

LE, JOHN H

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/076,803

Applicant(s)

SCANLAN ET AL.

Examiner

John H Le

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-10 is/are rejected.
- 7) ☒ Claim(s) 3 and 4 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because of the form and legal phraseology often used in patent claims, such as "comprises" (line 2) should be avoided.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1-2 and 5-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Scanlan et al. (USP 6,441,620).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome

either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1, 9, and 10, Scanlan et al. teach computer and a method for fault identification, classification fault in a plasma process chamber powered by an RF source (e.g. Fig.4, Abstract), comprising the steps of: a) running a plurality of different baseline processes on the chamber (e.g. Col.1, lines 63-67), (b) in respect of each baseline process, determining the magnitudes of a plurality of Fourier components of delivered RF power and storing the magnitudes as reference data for that baseline process (e.g. Col.1, line 63-Col.2, line 1), and c) when a fault is to be classified (e.g. Fig.4, step 30), repeating at least one of the said baseline processes according to a predetermined decision tree to classify the fault (e.g. Fig.4, step 30 go back to step 22, Col.2, line 7-11) by comparing the current magnitudes of the said Fourier components with the corresponding reference data (e.g. Col.2, lines 12-14).

Regarding claims 2, Scanlan et al. teach steps (a) and (b) are performed prior to a production run (e.g. Col. 3, lines 3-7, Col.4, lines 12-14, 52-56, Col.5, lines 4-5), wherein the method further comprises monitoring the chamber for faults during the production run (e.g. Col.3, lines 51-52), and wherein step (c) is performed upon detection of a fault during the production run (e.g. Col.4, lines 7-14).

Regarding claim 5, Scanlan et al. teach the Fourier components are those of the voltage, current and phase of the delivered RF power (e.g. Col.3, lines 1-7).

Regarding claim 6, Scanlan et al. teach each baseline process is carried out on a test substrate (e.g. Col.4, lines 28-30, lines 42-44).

Regarding claim 7, Scanlan et al. teach each baseline process is carried out on a product wafer (e.g. Col.4, lines 44-45).

Regarding claim 7, Scanlan et al. teach each baseline process is run in the absence of a substrate (e.g. Col.4, lines 43-44).

Allowable Subject Matter

4. Claims 3-4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3, none of the prior art of record teaches or suggests the combination of a method of fault classification in a plasma process chamber powered by an RF source, wherein the method comprising the steps of:

- a) running a plurality of different baseline processes on the chamber;
- (b) in respect of each baseline process, determining the magnitudes of a plurality of Fourier components of delivered RF power and storing the magnitudes as reference data for that baseline process; and
- c) when a fault is to be classified, repeating at least one of the said baseline processes according to a predetermined decision tree to classify the fault by comparing the current magnitudes of the said Fourier components with the corresponding

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reference data; wherein steps (a) and (b) are performed prior to scheduled downtime of the chamber and step (c) is performed after the scheduled downtime and prior to a production run.

It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 4, none of the prior art of record teaches or suggests the combination of a method of fault classification in a plasma process chamber powered by an RF source, wherein the method comprising the steps of:

- a) running a plurality of different baseline processes on the chamber;
- (b) in respect of each baseline process, determining the magnitudes of a plurality of Fourier components of delivered RF power and storing the magnitudes as reference data for that baseline process; and
- c) when a fault is to be classified, repeating at least one of the said baseline processes according to a predetermined decision tree to classify the fault by comparing the current magnitudes of the said Fourier components with the corresponding reference data; wherein the different baseline processes comprise a first baseline process including the same gases as those used in a production run for which the chamber is used, a second baseline process running an inert gas plasma, and a third baseline process running at sufficiently low power that no plasma ignites.

It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Other Prior Art

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Scanlan et al. (USP 6,656,848) disclose a method of conditioning an RF-powered plasma-processing chamber after cleaning the interior chamber walls.

Oluseyi et al. (USP 6,603,538) disclose a method and an apparatus system feature detecting faults in process conditions of a plasma-based semiconductor processing system by sensing the spectral emissions of the plasma.

Collins et al. (USP 6,252,354) disclose a RF tuning method for an RF plasma reactor using frequency serving and power, voltage, current or DI/DT control.

Hopkins (USP 5,808,415) discloses an apparatus for sensing RF current delivered to plasma with two inductive loops.

Saxena (USP 5,642,296) disclose a method of diagnosing malfunctions in semiconductor manufacturing equipment.

Turner et al. (USP 5,576,629) disclose a plasma monitoring and control method and system monitor and control plasma in an electronic device fabrication reactor by sensing the voltage of the radio frequency power that is directed into the plasma producing gas at the input to the plasma producing environment of the electronic device fabrication reactor.

Contact Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H. Le whose telephone number is (703) 605-4361. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on (703) 308-3126. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

John H. Le
Patent Examiner-Group 2863
December 12, 2003



John Barlow
Supervisory Patent Examiner
Technology Center 2800